

## Exercise Set 2

### Principles of Computing

Week 4 of Fall Semester, 2024

## 1 Exercises

### Python

1. 1.1. What is the *type* and *value* of `"hello, world!"[4]`?
- 1.2. What is the *type* and *value* of `[4]`?
2. Let `line = "A cup of espresso here is €2, and a croissant is €5."`.
  - 2.1. What does `line[::-1].index(" ")` evaluate to?
  - 2.2. What value does `line.lower().index("a")` return?
  - 2.3. What would be the result of `line[:line.index("2")]`?
  - 2.4. What if we instead evaluated `line[:line.index("3")]`?
  - 2.5. How do we find the price of two coffees and a pastry?
3. Define a function in `~/exercise03.py` that, given an input string, prints the longest *word*<sup>1</sup> in the string along with its length.<sup>2</sup>

```

1 def longestr(sentence):
2     # code here
3
4     longestr("Memory believes before knowing remembers.")
5     longestr("the reason for living was to get ready to stay dead")
6     longestr("I was the shadow of the waxwing slain")
7     longestr("By the false azure in the windowpane.")

```

```

1 username@host ~ python3 exercise03.py
2 remembers. 10
3 reason 6
4 waxwing 7
5 windowpane. 11

```

4. Suppose you have a file in your home directory named `exercise04.py`. In this file, define a function that takes one integer as input and returns the product of all of that integer's digits as its output.

```

1 def digimon(num):
2     # code here
3
4     print(digimon(2), digimon(16), digimon(128), digimon(1024))

```

```

1 username@host ~ python3 exercise04.py
2 2 6 16 0

```

Suppose this is all we know for this problem: there are two one-digit integers in this string that represent the prices of a coffee and pastry respectively.

<sup>1</sup> A *word* is a contiguous string or substring of characters containing no whitespace and which is only surrounded by whitespace characters.

<sup>2</sup> Break ties between words arbitrarily.

Running this file should display in the terminal the output shown here to the left.

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## 2 Solutions

### Python

1. 1.1. The *type* is `str` and the *value* is `"o"`.  
This is the fifth character of the string `"hello, world!"`.
- 1.2. The *type* is `list` and the *value* is `[4]`.  
This is a list containing the integer `4` as its only element.
2. 2.1. The `int` object `3`.
- 2.2. The `int` object `0`.
- 2.3. The `str` object `"A cup of espresso here is €"`.
- 2.4. This throws a `ValueError` since `"3"` isn't a substring of `line`.
- 2.5. Here's one way we can do this using a `for` loop and a `list`.

```

1 seen_a_num_yet = False
2 digits = ["0", "1", "2", "3", "4", "5", "6", "7", "8", "9"]
3 for char in line:
4     if char in digits:
5         if not seen_a_num_yet:
6             coffee = int(char)
7             seen_a_num_yet = True
8         else:
9             pastry = int(char)
10    print(2*coffee + pastry)

```

3. Here's one way to do this using a `for` loop.

```

1 def longestr(sentence):
2     current = ""
3     longest = ""
4     sentence += " "
5     for char in sentence:
6         if char == " ":
7             if len(current) > len(longest):
8                 longest = current
9             current = ""
10        else:
11            current += char
12    print(longest, len(longest))

```

4. Here's one way to do this using a `for` loop.

```

1 def digimon(num):
2     product = 1
3     for char in str(num):
4         product *= int(char)
5     return product

```